Optimizing the control of foot-and-mouth disease in Denmark by simulation

Influence of livestock markets on spread of FMD

Boklund, Anette ; Hisham Beshara Halasa, Tariq; Christiansen, Lasse Engbo; Enøe, Claes

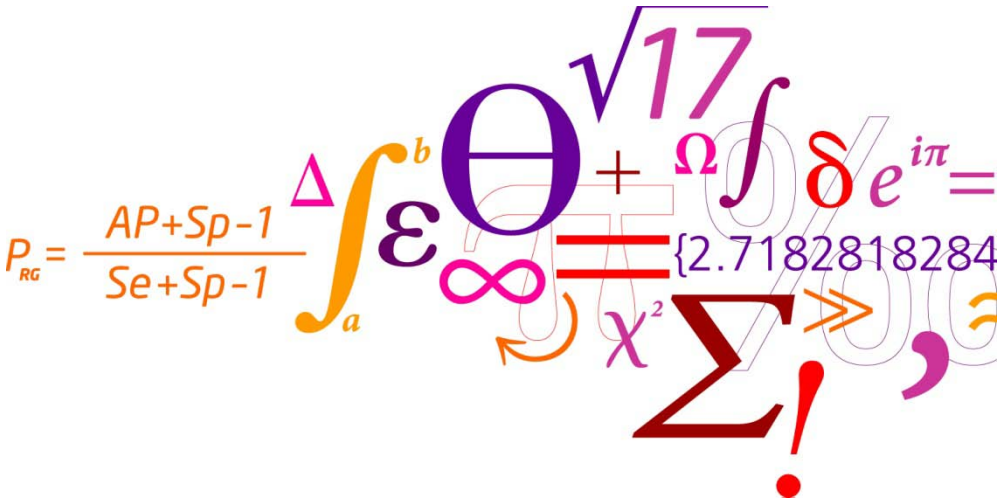
Publication date:
2012

Document Version
Publisher's PDF, also known as Version of record

Optimizing the control of foot-and-mouth disease in Denmark by simulation

Influence of livestock markets on spread of FMD

Anette Boklund
Tariq Halasa
Lasse Engbo Christiansen
Claes Enøe



DTU Vet
National Veterinary Institute

Materials and method

- Simulated in ISP, basic scenario
- Only start in **cattle** herds
- Extra
  - Movements to markets per herd (daily probability)
  - Recieving from markets (yes/no)
- Starting in 386 herds
  - highest prob. of moving to market
  - Each index run 100 times
- Same without markets

Copy-right: Brørup marked

Materials and method

- Extra contacts
  - 3.5

- Probability of transmission
  - normal distribution μ=0.415, sd=0.06.
    - Purchased animals
    - Indirect contact from visitors

- Closed at first detection
  - HRP only = 21 days

Epidemiologic results - Markets

Simulated scenario	Epidemic duration (days[1)]	Number of detected herds	Number of depopulated herds	Size of infected area (1000 km^2)
With markets	90 (9-262)	161 (4-631)	194 (5-754)	14.3 (0-37.5)
Without markets	87 (8-262)	144 (3-612)	173 (4-731)	9.8 (0-35.6)

Economics

Epidemiologic results - Markets

Simulated scenario median (5-95%)	Direct costs (10^6€)	Export losses (10^6€)	Total costs and losses (10^6€)
With markets	37.5 (6.8-126.7)	629.6 (375.7-1166.7)	670.9 (382.6-1284.5)
Without markets	33.9 (6.5-124.7)	613.8 (370.5-1161.8)	651.6 (377.4-1277.8)

Conclusions

- With markets
  - Longer, larger and more costly epidemics

- This is with a highly contagious disease

  - Less contagious diseases

    - Are not spread as quickly
    - BUT can spread silently in longer periods
    - Might not lead to closure of markets

Copy-right: Kirsten Tjørnehøj, VET-DTU, Lindholm

Thank you for your attention